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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/563,100	12/30/2005	Shinya Sonobe	5287-0101PUS1	6761

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BIRCH STEWART KOLASCH & BIRCH  
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EXAMINER
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TAYLOR, EARL N

ART UNIT	PAPER NUMBER
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2818

NOTIFICATION DATE	DELIVERY MODE
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06/29/2007

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

## Office Action Summary

Application No.

10/563,100

Applicant(s)

SONOBE ET AL.

Examiner

Earl N. Taylor

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 30 December 2005 to 13 March 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-6,8-15 and 17-28 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6,8-15 and 17-28 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12/30/2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 12/30/05, 3/10/06 and 3/29/06.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Priority***

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### ***Information Disclosure Statement***

This office acknowledges receipt of the following items from the applicant:  
Information Disclosure Statements (IDS) filed on 30 December 2005, 10 March 2006 and 29 March 2006. The references cited on the PTOL 1449 forms have been considered.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

**Claims 21, 23, 24, 27 and 28 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.**

Claim 21 recites the limitation "the side face" in line 3. There is insufficient antecedent basis for this limitation in the claim.

Claims 23, 27 and 28 recite the limitation "the sides". There is insufficient antecedent basis for this limitation in the claim.

Claim 24 recites the limitation "the portions disposed on the sides". There is insufficient antecedent basis for this limitation in the claim.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

**Claims 1-3, 5, 6, 8-11 are rejected under 35 U.S.C. 102(b) as being anticipated by Uemura (U.S. Patent Application Publication 2003/0052328 A1).**

Referring to Claim 1, Uemura teaches, in Fig. 1 and 3 for example, a semiconductor element, comprising a nitride semiconductor layer (15; par. 54 and 62), an electrode connected to said nitride semiconductor layer (20a), and an insulating film (30) covering at least part of said electrode (20a), wherein the electrode comprises: a first metal film (21-24; first lower adhesive layer, first upper adhesive layer, Ag-based layer, second lower adhesive layer) including silver (Ag; par. 69) and in contact with the nitride semiconductor layer (15); and a second metal film (25; second upper adhesive layer) completely covering the first metal film (21-24), and wherein the first metal film is formed from a multilayer film (21-24) including a film (23) comprising silver (Ag; par. 69), and a metal film (Au; 24) that inhibits a reaction with silver and is disposed over the silver (Ag; 23), and the insulating film (30) comprises a nitride film (par. 39). The

manner in which the claim is written does not specifically define what element(s) are inhibited by a reaction with silver. Therefore, having any arbitrary metal film on the silver layer will inhibit some reaction with silver; for example, the metal film of Uemura would prevent air from reacting with the silver.

Referring to Claim 2, Uemura teaches, in Fig. 1 and 3 for example, a semiconductor element, comprising a nitride semiconductor layer (15; par. 54 and 62), an electrode (20a) connected to said nitride semiconductor layer (15), and an insulating film (30) covering at least part of said electrode (20a), wherein the electrode (20a) comprises: a first metal film (21-24) including silver (Ag; par. 69) and in contact with the nitride semiconductor layer (15); and a second metal film (25) formed so as to prevent the silver from moving across the surface of the nitride semiconductor layer (15), and the insulating film (30) comprises a nitride film (par. 39). Because the layers are fixed in a final product the layers do not move, including the silver layer (23).

Referring to Claims 3 and 12, Uemura teaches all of the limitations of Claims 1 and 2, wherein the nitride film (30) is formed from either silicon nitride or silicon oxynitride (par. 39).

Referring to Claims 5 and 14, Uemura teaches all of the limitations of Claims 1 and 2, wherein the first metal film includes a film comprising silver or a silver alloy, and a nickel film disposed in a partial area between said silver film and the nitride semiconductor layer (par. 30-34).

Referring to Claims 6 and 15, Uemura teaches all of the limitations of Claims 1 and 2, wherein the second metal film (25) comprises a metal that inhibits a reaction with

silver at least in the region in contact with the first metal film (21-24). The manner in which the claim is written does not specifically define what element(s) are inhibited by a reaction with silver. Therefore, having any arbitrary metal film on the silver layer will inhibit some reaction with silver; for example, the metal film of Uemura would prevent air from reacting with the silver.

Referring to Claim 8, 9, 17 and 18, Uemura teaches all of the limitations of Claims 1, 2, 6 and 15, wherein the second metal film (25) comprises a metal selected from the group consisting of nickel (Ni), titanium (Ti), cobalt (Co) and chromium (Cr), and disposed at least in the region in contact with the first metal film and wherein at least the region of the second metal film (25) that is in contact with the first metal film (21-24) is formed from nickel (par. 33 and 34).

Referring to Claims 10 and 19, Uemura teaches all of the limitations of Claims 1 and 2, wherein the nitride semiconductor layer comprises a nitride semiconductor layer (13) of a first conduction type, a light emitting layer (14), and a nitride semiconductor layer (15) of a second conduction type that is different from that of the nitride semiconductor layer (13) of the first conduction type, in that order, and an electrode (20a) connected to the nitride semiconductor layer is a second electrode connected to the semiconductor layer (15) of the second conduction type (par. 54-65).

Referring to Claims 11 and 20, Uemura teaches all of the limitations of Claims 1, 2, 10 and 19, wherein the nitride semiconductor layer (13) of the first conduction type is an n-type semiconductor layer, and the nitride semiconductor layer (15) of the second conduction type is a p-type semiconductor layer.

Referring to Claims 21 and 25, Uemura teaches all of the limitations of Claims 1 and 2, as insofar as definite wherein the metal film (24) disposed over the silver film (23) constituting the first metal film (21-24) is formed such that there are no portions disposed on a side face therefore anticipates wherein the thickness of the portion disposed on the side face is less than the thickness of the portion disposed over the silver film.

Referring to Claims 22 and 26, Uemura teaches all of the limitations of Claims 1 and 2, wherein a nickel film is disposed in a partial area between the silver or silver alloy film constituting the first metal film (21-24) and the nitride semiconductor layer (15) (par. 31-32).

Referring to Claims 23 and 27, Uemura teaches all of the limitations of Claims 1 and 2, wherein the first metal film (21-24) other than the silver film (23) so only thicknesses of 21, 22 and 24 are included:

Layer (21) is 0.1nm – 50nm thick

Layer (22) is 1nm – 500nm thick

Layer (24) is 1nm – 1000nm thick

So choosing the minimum required thickness for these layers yields a total 1<sup>st</sup> metal thickness without the silver film (23) of 2.1nm.

The second metal film (25; second upper adhesive layer) is 1nm – 1000nm thick, so choosing the maximum required thickness of 1000nm.

Therefore, the second metal film (25) having a thickness of 1000nm is thicker than the first metal film other than the silver film (21, 22 and 24; excluding 23) on the sides of the first metal film (par. 32 and 35). As insofar as definite, the sides are being defined as the left and right edge thickness of the layers.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 4 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Uemura (U.S. Patent Application Publication 2003/0052328 A1) in view of Kim et al. (Microstructural study of Pt contact on p-type GaN).**

Referring to Claims 4 and 13, Uemura teaches all of the limitations of Claims 1 and 2, but does not explicitly state wherein the first metal film is a single crystal at least at the interface with the nitride semiconductor layer. However, Kim teaches epitaxially growing a platinum contact on p-type GaN. It is incredibly well known and standard in the art that in order for light emitting devices to properly function, the GaN semiconductor layer must be as pure as possible, meaning that the GaN layer must be single crystalline thereby not having grain boundaries that degrade the performance of the device, thus epitaxially growing the platinum contact on the single crystal GaN layer

will result in a single crystal metal film at least at the interface. Therefore it would have been obvious to one of ordinary skill in the art to provide the epitaxially grown platinum layer on the single crystal GaN layer thus providing a single crystal metal film at least at the interface with the nitride layer in order to decrease the contact resistivity (abstract).

**Claims 24 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Uemura (U.S. Patent Application Publication 2003/0052328 A1).**

Referring to Claims 24 and 28, the prior art of Uemura teaches, in Fig. 5 for example, a semiconductor element, comprising a nitride semiconductor layer (104), an electrode (111, 112) connected to said nitride semiconductor layer (104), and an insulating film (113) covering at least part of said electrode (111, 112), wherein the electrode (111, 112) comprises: a first metal film (111; Ag-based layer) including silver and in contact with the nitride semiconductor layer (104); and a second metal film (112) completely covering the first metal film (111); wherein the second metal film (112) comprises a metal that inhibits a reaction with silver at least in the region in contact with the first metal film (111) (par. 5-7) and as insofar as definite wherein the second metal film (112) is formed on the sides such that the portions disposed on the sides are thicker than the portion disposed above the first metal (111) as shown but does not explicitly state wherein the insulating film (113) comprises a nitride film or wherein the first metal film (111) is formed from a multilayer film including a film comprising a metal film that inhibits a reaction with silver and is disposed over the silver. Uemura teaches that materials used for the insulating film (protection film) include silicon oxide, silicon nitride,

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aluminum oxide, and titanium nitride (par. 39). Uemura also teaches, in Fig. 3 for example, wherein the first metal film (20a) is formed from a multilayer film including a film comprising silver (23; Ag) and a metal film (24, 25) that inhibits a reaction with silver and is disposed over the silver (23) as shown. The manner in which the claim is written does not specifically define what element(s) are inhibited by "a reaction" with silver. Therefore, having any arbitrary metal film on the silver layer will inhibit some reaction with silver; for example, the metal film of Uemura would prevent air from reacting with the silver. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide an insulating layer that is a nitride as is it standard and conventional insulating material in the art for protecting the device (par. 39) and to replace the first metal layer (111) comprising silver of the prior art of Uemura with the first metal layer (20a) of Uemura such that the second metal layer (112) covers the top and the sides of the first metal layer thus having a thickness on the sides thicker than the portion disposed above the first metal in order to provide better adhesion to the nitride semiconductor layer (par. 30).

#### ***Telephone / Fax Information***

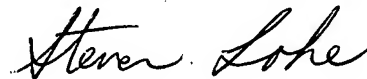
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Earl N. Taylor whose telephone number is (571) 272-8894. The examiner can normally be reached on Monday-Friday from 8:30AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Loke can be reached on (571) 272-1657. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Examiner: Earl N. Taylor

STEVEN LOKE  
SUPERVISORY PATENT EXAMINER

A handwritten signature in cursive script that reads "Steven Loke".